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(54) Automatically rapidly deployed road block

(57) A portable road block comprises an array 2 of vehicle disabling elements 5, for example tyre piercing spikes (explosive or otherwise) or explosive devices, wherein there is provided means for rapidly deploying the array across a road automatically. The array, in the form of a lazy tongs lattice 2, is fixed at one end by an anchor 4 and is attached at the other end to a trolley 3 adapted to be propelled across the road, while the array 2 is paid out from the back of the trolley 3 as it crosses the road. The trolley 3 may be propelled by a compressed air supply, or electrically actuated explosive gas cartridge in a propulsion unit 1. The trolley 3 can be arranged to be activated from a remote position.

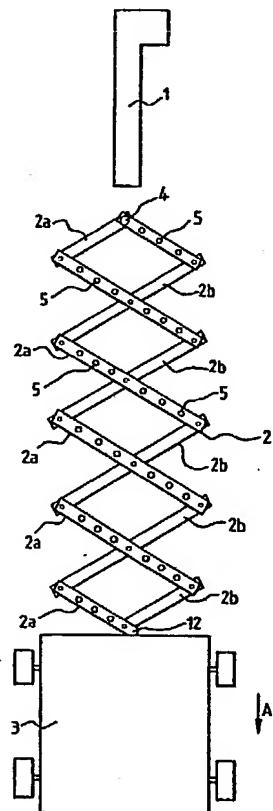


FIG.1.

The drawings originally filed were informal and the print here reproduced is taken from a later filed formal copy.

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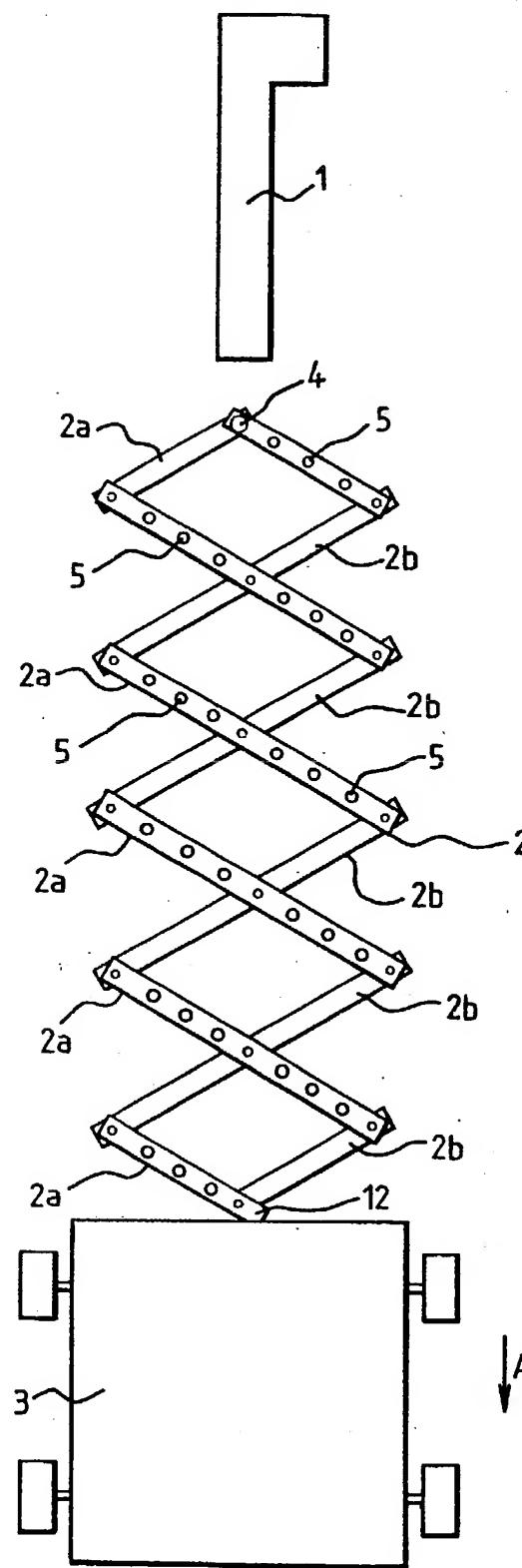


FIG. 1.

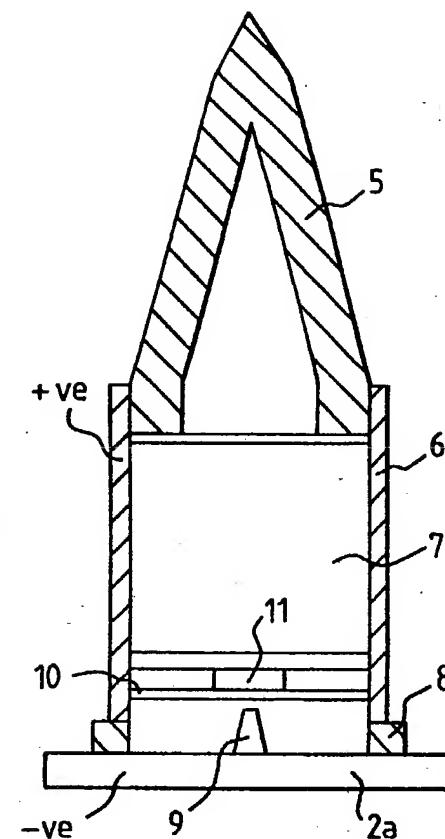


FIG. 2.

SPECIFICATION

Road block

5 This invention relates to road blocks. In particular it relates to portable road blocks of the type which may be rapidly deployed across a road in the path of an oncoming vehicle.
 Such road blocks normally comprise an array of
 10 hollow spikes which are detachably affixed to a strip laid across the road. When a vehicle is driven over the strip, one or more of the spikes penetrate a vehicle tyre, being carried off by the tyre, and lead to controlled deflation of the tyre, bringing the vehicle to a stop without its going completely out of control.
 One known version of such a road block provides a lazy tongs lattice carrying the spikes. The lattice is fed from a container anchored at one side of the road. A police officer holds a rope attached to an end
 20 of the lattice and, when faced with an oncoming vehicle which may refuse to stop, is supposed to run to the opposite side of the road, deploying the lattice work across the road. This does not work well in practice as the officer may need to go in the other direction for safety, or the rope may be dropped.
 A first aspect of the invention provides a portable road block comprising an array of vehicle disabling elements, for example, tyre piercing spikes, wherein there is provided means for rapidly deploying the
 30 array across a road automatically.
 Preferably, the array is carried on a trolley. The array is fixed at one end and the trolley propelled across the road. The array is paid out from the back of the trolley as it crosses the road. This arrangement
 35 has the advantage that the weight of the trolley decreases as it crosses the road, thus helping to sustain the speed of the trolley.
 The trolley may be propelled by a compressed air supply, or by an electrically actuated explosive gas cartridge. The trolley can be arranged to be activated from a remote position.
 Known portable road blocks suffer from the drawback that they do not stop lorries or other heavy
 40 tyred vehicles. The spikes will not penetrate the tyre
 45 tread sufficiently to cause rapid deflation.
 Another aspect of the invention provides a road block comprising an array of vehicle disabling elements each comprising an electrically actuated explosive safety cartridge, which elements are
 50 arranged to be fired individually as a vehicle tyre or the like presses on the element.
 In some circumstances the explosion of the safety cartridge alone may be sufficient to disable a vehicle.
 Another aspect of the invention provides a vehicle
 55 disabling element for a road block comprising a hollow spike which is mounted to be fired into a tyre as it is driven onto the spike.
 Preferably the spike is fired by an electrically activated explosive safety cartridge.
 60 In either case, the cartridge may be held in a sleeve making electrical contact with an outer cartridge terminal and held spaced from a second electrical contact by a frangible non-conducting seal. As the element takes the weight of the tyre, it moves and
 65 breaks the seal so that the second contact is made,

firing the cartridge to drive the spike into the tyre, or simply explode onto the tyre.
 The elements may be deployed individually across a road, each being wired independently to a voltage source or each carrying a voltage supply such as a small cell to fire the cartridge.
 Advantageously the spikes or vehicle disabling elements are incorporated in the road block of the first aspect of the invention.
 75 The invention will be further described with reference to the accompanying drawings in which:
Figure 1 illustrates schematically a road block according to the invention; and
Figure 2 illustrates schematically a spike and its mounting according to the invention.
 In *Figure 1* an array in the form of a lazytongs lattice 2, preferably made from a light metal material is shown being deployed from a trolley 3 which is propelled in the direction of arrow A. The lattice 2 is
 85 made up of two sets of generally parallel arms 2a, 2b. Trolley 3 is shown as on wheels, but may for example simply skid across the road.
 The lattice 2 is anchored at one end by an anchoring spike 4 and one set of the generally
 90 parallel arms 2a carries vehicle disabling elements in the form of detachable hollow spikes or explosive devices 5. Several spikes 5 are attached to each arm 2a, at intervals to ensure that a vehicle tyre will not pass between the spikes when the array is deployed.
 95 The spikes 5 may include pressure activated explosive charges (*Figure 2*) or detachable hollow barbed spikes which become embedded in a car tyre, causing level deflation of the tyre.
 A propulsion unit 1 is positioned on the ground
 100 behind the trolley 3 and the anchor 4 which anchors the near end of the lattice 2. The propulsion unit provides a force sufficient to push the trolley across the road, the lattice 2 being paid out behind the trolley, thus reducing the weight of the trolley as it crosses the road, helping to maintain the speed of the trolley as it loses momentum.
 The propulsion unit 1 may be a long stroke, sealed, compressed air driven piston unit or it may utilise an explosive propellant cartridge.
 110 When using non-explosive spikes it is important that the orientation of the spikes in their supporting cups be maintained to ensure uniform penetration into the tyre, hence it is preferred to use a uniform accelerating device for the trolley 3, such as the
 115 long stroke, compressed air driven propulsion unit, rather than an explosive propulsion unit.
 The propulsion unit 1 may be attached to the trolley 3, but preferably is left behind as shown in the example. The unit 1 may be actuated electrically
 120 from a remote position or mechanically from alongside.
 In *Figure 2*, a hollow spike 5 is mounted on top of an explosive cartridge 7 which is mounted in an electrically conducting cylinder 6 which makes
 125 electrical contact with the outer wall of the cartridge to provide a first firing terminal. The cylinder 6 is mounted on a non-conducting base 8 on an arm 2a for deployment across a road. Arm 2a is electrically conducting and has an upwardly projecting conducting contact spike 9. Cartridge 7 is spaced

from the contact spike 9 by a frangible plastics membrane 10 which slides in the cylinder 6. Pressure by a tyre on the top of the spike 5 drives the cartridge 7 and membrane 10 onto the contact spike 9, the membrane 10 then breaking to complete the electrical connection to a terminal 11 on the base of the cartridge 7 and so fire it, propelling the spike 5 upwardly into the tyre to cause deflation.

The spike 5 need not itself damage the tyre, the explosive charge being sufficient in many circumstances to rupture a tyre or severely disrupt the vehicle tracking or suspension.

The arms 2a and 2b are part of a trellis, as seen on Figure 1, allowing for compact storage of the lattice 2, and maximum extended length of the lattice 2 across a road.

The cylinders 6 are electrically connected to a terminal of a voltage source by a wires running along the lattice 2.

20 The arms 2a of the lattice 2 are connected to a voltage source by a sliding rotating switch which may be mounted inside the trolley 3. Alternatively a sliding rotating switch may be mounted on each pivot point 12 between the two sets of arms 2a, 2b.

25 The switches are designed to connect the voltage source to the arms 2a, 2b when the lattice 2 has extended to 75 per cent of its normal working length. Hence, the cartridges 7 are not powered (primed) until the lattice 2 is deployed, ensuring the safety of 30 an operative. A further control switch can be provided at one or both ends of the lattice 2 to deactivate the cartridges 7 prior to gathering up the lattice 2 after use.

By using electrical safety cartridges the road block 35 is quite safe to handle, the cartridges not being fired until there is sufficient pressure to break the membrane 8 to complete the electrical circuit.

In another form the electrical circuit to the cartridge may be made simply by a normally open 40 switch, which is closed by tyre pressure or according to some other control, to fire the cartridge.

Various modifications may be made within the scope of the invention.

45 CLAIMS

1. A portable road block comprising an array of vehicle disabling elements, wherein there is provided means for rapidly deploying the array 50 across a road automatically.

2. A road block as claimed in claim 1, in which the disabling elements are tyre piercing spikes.

3. A road block as claimed in claim 1 or 2, in which the array is carried on a trolley.

55 4. A road block as claimed in any preceding claim, in which the array is fixed at one end and the trolley is propelled across the road.

5. A road block as claimed in claim 4, in which the trolley is propelled by a compressed air supply.

60 6. A road block as claimed in claim 4, in which the trolley is propelled by an electrically actuated explosive gas cartridge.

7. A road block as claimed in claims 5 or 6, in which the trolley is activated from a remote position.

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8. A road block as claimed in any preceding claim, in which the array is paid out from the back of the trolley as the trolley crosses the road.

9. A road block as claimed in any of the preceding 70 claims, in which the vehicle disabling elements each comprise an electrically actuated explosive safety cartridge, which elements are arranged to be fired individually as a vehicle tyre or the like presses on the element.

75 10. A road block as claimed in any of claims 1 to 8, in which the vehicle disabling elements each comprise a hollow spike which is mounted to be fired into a tyre as the tyre is driven onto the spike.

11. A road block comprising an array of vehicle 80 disabling elements each comprising an electrically actuated explosive safety cartridge, which elements are arranged to be fired individually as a vehicle tyre or the like presses on the element.

12. A road block as claimed in claim 11, in which 85 the explosion of the safety cartridge alone disables a vehicle.

13. A vehicle disabling element as claimed in 90 claim 12, in which the cartridge is held in a sleeve making electrical contact with an outer cartridge terminal.

14. A vehicle disabling element as claimed in 95 claim 12 or 13, in which the cartridge is held spaced from a second electrical contact by a frangible non-conducting seal.

15. A vehicle disabling element for a road block comprising a hollow spike which is mounted to be fired into a tyre as the tyre is driven onto the spike.

16. A vehicle disabling element as claimed in 100 claim 15, in which the spike is fired by an electrically activated explosive safety cartridge.

17. A vehicle disabling element as claimed in 105 claim 16, in which the cartridge is held in a sleeve making electrical contact with an outer cartridge terminal.

18. A vehicle disabling element as claimed in 110 claim 16 or 17, in which the cartridge is held spaced from a second electrical contact by a frangible non-conducting seal.

19. A vehicle disabling element as claimed in any 115 of claims 15 to 18, in which the element is arranged to move under the pressure exerted by a tyre to make the second contact, which in turn fires the cartridge to drive the spike into the tyre.

20. A road block substantially as hereinbefore 120 described with reference to the accompanying drawings.

21. A vehicle disabling element substantially as 125 hereinbefore described with reference to Figure 2 of the accompanying drawings.